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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|---|---|---|---|
| 09/439,225 | 11/12/1999 | CARLOS SALDANHA | 1162.007US1 | 1407 |

21186 7590 09/07/2006

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| EXAMINER | |
|---|---|
| WANG, JIN CHENG | |
| **ART UNIT** | **PAPER NUMBER** |
| 2628 | |

DATE MAILED: 09/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. 09/439,225 | Applicant(s) SALDANHA ET AL. |
|---|---|---|
| | Examiner Jin-Cheng Wang | Art Unit 2628 |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *10 August 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-45* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-45* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

## DETAILED ACTION

### *Response to Amendment*

The submission filed on 8/10/2006 has been entered. Claims 1, 6-9, 16, 18-19, 29-36, 38, and 44 have been amended. Claims 1-45 are pending in the application.

### *Response to Arguments*

Applicant's arguments filed August 10, 2006 have been fully considered but are moot in view of the new ground(s) of rejection set forth in the present Office Action.

As address below, the Claim 1 is unpatentable over Sakaguchi U.S. Patent No. 6,310,627 (hereinafter Sakaguchi) in view of Pascal Volino, Nadia Magnenat Thalmann, Shen Jianhua, D. Thalmann, "The Evolution of a 3D System for Simulating Deformable Clothes on Virtual Actors", MIRALab 1998 (hereinafter Volino) and Weaver U.S. Patent No. 6,404,426 (hereinafter Weaver).

For example, Sakaguchi teaches displaying a system and method for generating a three-dimensional image representing a stereoscopic shape of a garment when the garment is put on a three-dimensional object such as a person's figure. The system and method comprise generating a 3D image of an object model corresponding to the person's figure; inputting information on the person's figure and a try-on garment; arranging the images of the respective patterns of the garment in corresponding portions of the 3D image of the object model, three-dimensionally deforming the images of the respective patterns by calculating collisional deformations when the respective patterns are <u>pressed</u> against the corresponding portions based on the information on the garment, and generating a stereoscopic image of the garment by connecting the deformed 3D

images of the respective patterns based on the information on the garment. Moreover, Sakaguchi teaches rendering the garment animation images on the three-dimensional character images and simulating a deformation in the garment caused by the collision of the human model and the garment when the human model is moved (column 31, lines 21 to column 33, line 38). The collision and animation of the garment with respect to the human model correspond to the draping and collision of the garment with the mannequin wherein the patterns and deformation parameters affects the draping and collision of the garment with the human model.

See column 8, lines 30-35 wherein the cited reference discloses a range defined by a maximum moving distance of the human model M per unit time with a margin; the triangular patches of the human model M corresponding to the respective lattice points are detected and the coordinates of the respective lattice points of the patterns D are moved according to the moving distances of the corresponding triangular patches of the human model M during the unit time.

The cited reference teaches constraining portions of the garment C to reside within or outside the one or more triangle patches enclosed by <u>the lattice points ci</u> defined with a distance from the lattice point ai from the mannequin M or the figure model M.

The cited reference also eaches constraining portions of the garment C' to reside within or outside the one or more shells or the triangle patches enclosed by <u>the lattice points ci'</u> defined with a distance from the lattice point ai' from the mannequin M' or the figure model M'.

In column 21, lines 35-63, Sakaguchi further discloses the pattern preparing system 40 for generating a plurality of patterns and for deforming the 3D image of the standard figure to generate an individual figure model and for generating a plurality of patterns for the garment fitted on the human model. Sakaguchi discloses constraining the garment to reside **<u>within or</u>**

**outside** of the triangle patches defined around the mannequin in the rendering frame. Sakaguchi also discloses constraining the garment to reside outside of the triangle patches of the human model defined around the mannequin in the rendering frame (col. 25, lines 1-67; col. 30, lines 24-65).

Therefore, Sakaguchi at least suggests the claim limitation of "the shell defined around the mannequin" because Sakaguchi discloses the shape of the garment (as broken into triangle patches) as fitted into the shape of the human model (col. 25, lines 1-67; col. 30, lines 24-65).

Therefore, it would have been obvious to incorporate the shell defined around the surface of the mannequin. Doing so would enable simulation and calculation of the collisional deformations when the respective patterns are pressed against the corresponding portions based on the information on the garment (column 31, lines 21 to column 33, line 38).

Volino discloses, *inter alia*, the claim limitation wherein each shell is a three-dimensional construct (the shell can be visualized in Volino Fig. 10) designed to mimic the physical interaction of the garment with another garment (Page 14) and rendering a two-dimensional image of the garment from the rendering frame and layering the rendered garment image upon a two-dimensional image of a selected mannequin (Page 14).

For example, Volino discloses in Page 10 and Page 17-18 the creation of the human models or the body representations. Volino discloses in Page 14 the garment design and simulation process wherein clothes are animated as deformable objects by assembling 2D panels wherein the garment models are designed as flat fabric panels using a 2D drawing software. The garment panels are used in the 3D simulation process wherein the animation will take place using mechanical simulation and then continuing the simulation on the animated scene and

characters and the scene may contain several objects, static or animated, that will interact with the GARMENTS through collision. Volino teaches that garments are loaded from a file containing the description of the 2D panels and the panels are discretized into triangle meshes and then interactively placed in an initial position that is suitable for seaming. When dressing the actor, the initial position is around the actor body. Then, using mechanical simulation, the panels are pulled together along the seaming lines using "elastics" which are attachment forces that pull together the corresponding vertices of both panels along the seaming line. Once the seaming lines are close enough, they are topologically merged, and the set of panels becomes one unique object.

Volino discloses complex dressings containing several garments are animated concurrently by the program. Full interaction is provided by collision detection and optimization for multilayer animated objects provides stability of the overall system. Incremental collision detection is also used when relative movements are slow enough.

Volino further discloses in Page 14 that the animated garments are finally recorded frame by frame as animations allowing incremental garment design for complex cloth.

It would have been obvious to one of the ordinary skill in the art to have incorporated Volino's teaching into Sakaguchi's method for producing an image of a computer-simulated mannequin because simulating layers of garments or garment panels are old and well known as taught in Volino. Moreover, Sakaguchi enables simulation and calculation of the collisional deformations when the respective patterns are pressed against the corresponding portions based on the information on the garment (Sakaguci column 31, lines 21 to column 33, line 38) and thereby at least disclosing the interaction among the garment patterns (garment panels).

Volino discloses generating objects corresponding to a representative mannequin (e.g., Page 10-11) and a garment placed in a simulation scene within a three-dimensional modeling environment (e.g., Page 14); simulating draping and collision (e.g., self-collision, crumpling to the ground of Page 5, stretching and bending deformations of Page 9; bending and wrinkling of Page 8, etc) of the garment with the representative mannequin (Fig. 10) within the simulation scene to generate a three-dimensional rendering frame of the representative mannequin wearing the garment (Page 14; Page 8 also discloses the output is a collection of frames of the computed animation; see Fig. 4); constraining portions of the garment to reside within or outside of one or more shells defined around the representative mannequin in the rendering frame (Fig. 10 and Page 8 discloses simulating several garments concurrently with reasonable computation time and numerous and interacting collisions resulting from crumpling or multilayer cloth handled efficiently and robustly wherein the simulation involves the constraints and the collision detection algorithm builds a geometrical surface region hierarchy and takes advantage of surface curvature within and between adjacent surface regions wherein the surface regions around the human model forms the outside shells defined around the representative mannequin as shown in Fig. 10; see Page 9; in Page 14, the 2D panels for the garment models such as flat fabric panels are defined around the representative mannequin or the human model; when dressing an actor, the triangle meshes are placed around the actor body).

One of the ordinary skill in the art would have been motivated to simulate/animate complex dressings containing several garments to provide full interaction by collision detection and optimization for multilayer animated objects and thereby providing stability of the overall system (Volino Page 14) and to simulate/animate the complex dressing combinations such as a

skirt and blouse combination wherein interaction between the skirt and blouse combination is simulated/animated (See Weaver column 5, lines 60-67).

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sakaguchi U.S. Patent No. 6,310,627 (hereinafter Sakaguchi) in view of Pascal Volino, Nadia Magnenat Thalmann, Shen Jianhua, D. Thalmann, "The Evolution of a 3D System for Simulating Deformable Clothes on Virtual Actors", MIRALab 1998 (hereinafter Volino) and Weaver U.S. Patent No. 6,404,426 (hereinafter Weaver).

Re claims 1 and 38, Sakaguchi teaches a method for producing an image of a computer-simulated mannequin wearing a garment as defined by selected mannequin and garment parameter values, comprising generating objects corresponding to a representative mannequin and a garment placed in a simulation scene within a three-dimensional modeling environment (e.g., col. 30, lines 57 to col. 33, lines 38), simulating draping and collision of the garment with the representative mannequin within the simulation scene to generate a three-

dimensional rendering frame of the representative mannequin wearing the garment (*e.g., col. 30, lines 57 to col. 33, lines 38),* constraining portions of the garment to reside within or outside of one or more shells *(the shells are interpreted in light of applicant's specification, see applicant's drawing in Fig. 8A and Fig. 6 wherein Fig. 8A and 6 defined 2D shells, the cited reference discloses shells in the form of the 2D patterns D" surrounding the 2D projection of the mannequin or the human model. Even if the shells are 3D regions around the mannequin or the human model, the cited reference discloses shells in the form of the 3D patterns D' surrounding the mannequin or the human model M'; See column 24-25 wherein the first projection function T in which the positional relationship between the lattice points ci and ai may be represented by vector distances therebetween and the second projection function in which the lattice points ai and ai' may be represented by vector distances therebetween; and the garment C' is related to M' by the first projection function; see column 22. The cited reference teaches constraining portions of the garment C' such as the patterns D' to reside within or outside the one or more shells or the planar regions enclosed by the lattice points ci' defined with a distance from the lattice point ai' from the mannequin M' or the figure model M'*) defined around the representative mannequin in the rendering frame during the draping and collision simulation (the shape of the garment as fitted into the shape of the human model; *see* e.g., col. 25, lines 1-67; col. 30, lines 24-65; *See column 7, lines 30-41 wherein the cited reference teaches arranging the patterns D in specified positions around the human model M and calculating the collisions of the patterns D with the human model M. See column 8, lines 30-35 wherein the cited reference discloses a range defined by a maximum moving distance of the human model M per unit time with a margin; the triangular patches of the human model M corresponding to the respective*

*lattice points are detected and the coordinates of the respective lattice points of the patterns D are moved according to the moving distances of the corresponding triangular patches of the human model M during the unit time*), and rendering an image from the rendering frame (e.g., col. 31, lines 21-55).

In other words, Sakaguchi teaches displaying a system and method for generating a three-dimensional image representing a stereoscopic shape of a garment when the garment is put on a three-dimensional object such as a person's figure. The system and method comprise generating a 3D image of an object model corresponding to the person's figure; inputting information on the person's figure and a try-on garment; arranging the images of the respective patterns of the garment in corresponding portions of the 3D image of the object model, three-dimensionally deforming the images of the respective patterns by calculating collisional deformations when the respective patterns are pressed against the corresponding portions based on the information on the garment, and generating a stereoscopic image of the garment by connecting the deformed 3D images of the respective patterns based on the information on the garment. Moreover, Sakaguchi teaches rendering the garment animation images on the three-dimensional character images and simulating a deformation in the garment caused by the collision of the human model and the garment when the human model is moved (column 31, lines 21 to column 33, line 38). The collision and animation of the garment with respect to the human model correspond to the draping and collision of the garment with the mannequin wherein the patterns and deformation parameters affects the draping and collision of the garment with the human model.

However, Sakaguchi does not expressly teach the claim limitation of "wherein each shell is a three-dimensional construct designed to mimic the physical interaction of the garment with

another garment" and "rendering a two-dimensional image of the garment from the rendering frame and layering the rendered garment image upon a two-dimensional image of a selected mannequin".

In column 21, lines 35-63, Sakaguchi further discloses the pattern preparing system 40 for generating a plurality of patterns and for deforming the 3D image of the standard figure to generate an individual figure model and for generating a plurality of patterns for the garment fitted on the human model. Sakaguchi discloses constraining the lattice points defining the garment with a vector distance from the lattice points forming the triangle patches of the mannequin in the rendering frame. See column 24-25 wherein the first projection function T in which the positional relationship between the lattice points ci and ai may be represented by <u>vector distances</u> therebetween and the second projection function in which the lattice points ai and ai' may be represented by vector distances therebetween; and the garment C' is related to M' by the first projection function; see column 22. The cited reference teaches constraining portions of the garment C to reside within or outside the one or more triangle patches enclosed by <u>the lattice points ci</u> defined with a distance from the lattice point ai from the mannequin M or the figure model M.

The cited reference also teaches constraining portions of the garment C' to reside within or outside the one or more shells or the triangle patches enclosed by <u>the lattice points ci'</u> defined with a distance from the lattice point ai' from the mannequin M' or the figure model M'.

Therefore, Sakaguchi at least suggests the claim limitation of "the shell defined around the mannequin" because Sakaguchi discloses the shape of the garment (as broken into triangle patches) as fitted into the shape of the human model (col. 25, lines 1-67; col. 30, lines 24-65)

wherein the shape of the garment are defined by the triangle patches which is the shell defined around the mannequin.

Volino discloses, *inter alia*, the claim limitation wherein each shell is a three-dimensional construct (the shell can be visualized in Volino Fig. 10) designed to mimic the physical interaction of the garment with another garment (Page 14) and rendering a two-dimensional image of the garment from the rendering frame and layering the rendered garment image upon a two-dimensional image of a selected mannequin (Page 14).

For example, Volino discloses in Page 10 and Page 17-18 the creation of the human models or the body representations. Volino discloses in Page 14 the garment design and simulation process wherein clothes are animated as deformable objects by assembling 2D panels wherein the garment models are designed as flat fabric panels using a 2D drawing software. The garment panels are used in the 3D simulation process wherein the animation will take place using mechanical simulation and then continuing the simulation on the animated scene and characters and the scene may contain several objects, static or animated, that will interact with the GARMENTS through collision. Volino teaches that garments are loaded from a file containing the description of the 2D panels and the panels are discretized into triangle meshes and then interactively placed in an initial position that is suitable for seaming. When dressing the actor, the initial position is around the actor body. Then, using mechanical simulation, the panels are pulled together along the seaming lines using "elastics" which are attachment forces that pull together the corresponding vertices of both panels along the seaming line. Once the seaming lines are close enough, they are topologically merged, and the set of panels becomes one unique object.

Volino discloses complex dressings containing several garments are animated concurrently by the program. Full interaction is provided by collision detection and optimization for multilayer animated objects provides stability of the overall system. Incremental collision detection is also used when relative movements are slow enough.

Volino further discloses in Page 14 that the animated garments are finally recorded frame by frame as animations allowing incremental garment design for complex cloth.

Volino discloses generating objects corresponding to a representative mannequin (e.g., Page 10-11) and a garment placed in a simulation scene within a three-dimensional modeling environment (e.g., Page 14); simulating draping and collision (e.g., self-collision, crumpling to the ground of Page 5, stretching and bending deformations of Page 9; bending and wrinkling of Page 8, etc) of the garment with the representative mannequin (Fig. 10) within the simulation scene to generate a three-dimensional rendering frame of the representative mannequin wearing the garment (Page 14; Page 8 also discloses the output is a collection of frames of the computed animation; see Fig. 4); constraining portions of the garment to reside within or outside of one or more shells defined around the representative mannequin in the rendering frame (Fig. 10 and Page 8 discloses simulating several garments concurrently with reasonable computation time and numerous and interacting collisions resulting from crumpling or multilayer cloth handled efficiently and robustly wherein the simulation involves the constraints and the collision detection algorithm builds a geometrical surface region hierarchy and takes advantage of surface curvature within and between adjacent surface regions wherein the surface regions around the human model forms the outside shells defined around the representative mannequin as shown in Fig. 10; see Page 9; in Page 14, the 2D panels for the garment models such as flat fabric panels

are defined around the representative mannequin or the human model; when dressing an actor, the triangle meshes are placed around the actor body).

It would have been obvious to one of the ordinary skill in the art to have incorporated Volino's teaching into Sakaguchi's method for producing an image of a computer-simulated mannequin because simulating layers of garments or garment panels are old and well known as taught in Volino. Moreover, Sakaguchi enables simulation and calculation of the collisional deformations when the respective patterns are pressed against the corresponding portions based on the information on the garment (Sakaguci column 31, lines 21 to column 33, line 38) and thereby at least disclosing the interaction among the garment patterns (garment panels).

One of the ordinary skill in the art would have been motivated to simulate/animate complex dressings containing several garments to provide full interaction by collision detection and optimization for multilayer animated objects and thereby providing stability of the overall system (Volino Page 14) and to simulate/animate the complex dressing combinations such as a skirt and blouse combination wherein interaction between the skirt and blouse combination is simulated/animated (See Weaver column 5, lines 60-67).

Re claims 2, 35, and 43, Sakaguchi discloses the rendered image is used to form a visual image on a computer display device (col. 27, lines 25-67; column 31, lines 21-55; column 33, lines 25-38). Sakaguchi teaches rendering the garment animation images on the character images and simulating a deformation in the garment in a three-dimensional simulation scene wherein the animation involves a 3D human model wearing a garment from the external storage

device and the scene is rendered frame by frame and thereby simulating the wearing style of the human model as the scene is rendered. Referring to the claim 35, Weaver further discloses in column 5, lines 6067 that the garment images contained in the repository include images of different versions of garments (small, medium or large or skirt and blouse, etc.) wherein different versions of a particular garment are combinable with specific other garments.

Re claims 3-4, 6-9, 13, 30-31, 33, and 36, Sakaguchi discloses generating rendering frames containing mannequin or garment objects as defined by selected parameter values by shape blending corresponding objects of previously generated rendering frames (column 25, lines 1-67; column 31, lines 21 to column 33, line 38). Shape blending refers to a technique used to change mannequin or garment dimensions by changing the dimension parameters in a previously generated rendering frame. However, Sakaguchi discloses changing the deformation parameters (a specific movement of the human model such as a leg or a hand gesture is moved and a selected number of parameters such as size information including height, shoulder, width, chest size associated with the selected body part is inputted via the input device to generate 3D animation images in which the human model moves in a specific manner; column 30, lines 37-65) of the garment in response to the change in dimensions of the human model and thereby simulating a corresponding frame of the animation image of the garment and thus simulating a deformation in the garment caused by the collision of the human model and the garment when the human model is moved (column 31, lines 21 to column 33, line 38). Volino further discloses in Page 14 storing the rendered garment image in a repository for containing a plurality of two-dimensional garment images (Volino discloses that garments are loaded from a file containing the description of the 2D panels). Volino further discloses the claim limitation set forth in the

claim 7 of generating multiple rendering frames for a plurality of different garments and layering a plurality of two-dimensional image of the different garments upon the selected mannequin. Volino discloses in Page 14 complex dressings containing several garments are animated concurrently by the program. Full interaction is provided by collision detection and optimization for multilayer animated objects provides stability of the overall system. Incremental collision detection is also used when relative movements are slow enough.

Volino further discloses in Page 14 that the animated garments are finally recorded frame by frame as animations allowing incremental garment design for complex cloth.

Re claims 5, 23, 42 and 45, Sakaguchi discloses the two-dimensional images are rendered from a rendering frame using a plurality of camera positions (column 25, lines 42-67; column 26, lines 1-42; col. 27, lines 54-67). Applicant admits that the camera referred to herein is not a real camera and refers only to a viewing position for rendering the image from the three-dimensional rendering frame. However, Sakaguchi teaches digitizing a three-dimensional image so that the 2D images of the garment patterns are generated with respect to a reference line or a viewpoint position. **Sakaguch further teaches *photographing a 3D model in motion along time axis at suitable angles* and under suitable lighting and the movements of the person in the three-dimensional virtual environment can be stereoscopically viewed from a variety of angles** (column 29, lines 30-36).

Re claims 10-12 and 39, Sakaguchi discloses the separate rendering frames are combined into a composite two-dimensional image using Z-coordinates of the objects

(col. 32, lines 7-16; col. 30, lines 37-65). First of all, Sakaguchi discloses combining the garment animation image and the human animation image (column 30, lines 37-67 to col. 31, lines 1-10). Sakaguchi further discloses the z coordinates in the Z buffer method for combining a plurality of patterns or frames to form a two-dimensional image (column 25, lines 42-67; column 26, lines 1-42; col. 27, lines 54-67; column 29, lines 30-36). **Sakaguchi teaches comparing (z coordinates of) the lattice points of the human model and the garment to generate a two-dimensional image** (col. 25, lines 1-67).

Re claims 14-15, Sakaguchi discloses a network and a processor-executable instructions (col. 27, lines 54-67).

Re claims 16, 19, 29, and 32, the limitations of claims 16, 19, 29, and 32 are analyzed as discussed with respect to claim 1 above except for generating rendering frames containing mannequin or garment objects as defined by selected parameter values by shape blending corresponding objects of previously generated rendering frames. Shape blending refers to a technique used to change mannequin or garment dimensions by changing the dimension parameters in a previously generated rendering frame. However, Sakaguchi discloses changing the deformation parameters (a specific movement of the human model such as a leg or a hand gesture is moved and a selected number of parameters such as size information including height, shoulder, width, chest size associated with the selected body part is inputted via the input device to generate 3D animation images in which the human model moves in a specific manner; column 30, lines 37-65) of the garment in response to the change in dimensions of the human model and thereby simulating a corresponding frame of the animation image of the garment and thus simulating a deformation in the garment caused by the collision of the human model and the

garment when the human model is moved (column 31, lines 21 to column 33, line 38). Sakaguchi discloses a shaping blending (column 30, lines 45-65) wherein a stereoscopic image of the garment put on the human model is simulated in which the 3D animation images representing the movement characteristics (shape change) of the garment by combining (blending) the garment animation image and the human animation image. Sakaguchi discloses calculating the collision of the human model and the garment to thereby calculate a 3D image in which the state of the garment changes more realistically and the change image is calculated for the respective parts, i.e., hands, legs, trunk of the human model (column 32, lines 40-65).

Volino also discloses the claim limitation of generating a second rendering frame containing a second mannequin (Page 10) and a second garment (Page 14) as defined by selected parameter values that specify different dimensions from the first mannequin and/or first garment (Page 15-16 wherein the parameter settings can be changed by the user through the user interface and Page 11 discloses the parameters for setting the different dimensions of the mannequin) by shape blending (Page 10-11) corresponding objects of the first rendering frame, wherein the shape blending is performed by linearly combining parameters of the first rendering frame and performing a partial draping and collision simulation (e.g., modeling and animating complex organic shapes at a fraction of the data points cost compared to more common patching techniques and the final object is constructed by blending the primitives and as the primitives are moved and deformed the resulting blended surface changes shape; see Page 10-11).

Re claims 17-18, 20-22, 24-28, 37, and 40-41, Sakaguchi discloses a plurality of garment patterns that are connected together during the draping and collision simulation and further wherein the garment parameters including the normal lines of the surface of the garment (col. 31,

lines 55-67). Referring to the claim 18 and 24, Sakaguchi further discloses wearing multiple garments from the garment animation image generator around the 3D images of the human model and defining parts of the human image model and garments so that the deformation in the garment caused by the collision of the garment and the human model is simulated (column 32, lines 8-65). Referring to the claim 20, Sakaguchi discloses that patterns for the garment images are combinable along the outside surface of the human model into the composite animated image. In column 21, lines 35-63, Sakaguchi further discloses the pattern preparing system 40 for generating a plurality of patterns and for deforming the 3D image of the standard figure to generate an individual figure model and for generating a plurality of patterns for the garment fitted on the human model. Sakaguchi also discloses constraining the garment to reside outside of the triangle patches of the human model defined around the mannequin in the rendering frame. Referring to the claim 21, shape blending refers to a technique used to change mannequin or garment dimensions by changing the dimension parameters in a previously generated rendering frame. However, Sakaguchi discloses changing the deformation parameters (a specific movement of the human model such as a leg or a hand gesture is moved and a selected number of parameters such as size information including height, shoulder, width, chest size associated with the selected body part is inputted via the input device to generate 3D animation images in which the human model moves in a specific manner; column 30, lines 37-65) of the garment in response to the change in dimensions of the human model and thereby simulating a corresponding frame of the animation image of the garment and thus simulating a deformation in the garment caused by the collision of the human model and the garment when the human model is moved (column 31, lines 21 to column 33, line 38). Referring to the claim 22, Sakaguchi

teaches mapping the pieces of information on the shape, material, color, pattern and the like of the desired garment for this garment before the 2D images of the patterns for the special garment is rendered.

Referring to the claims 26 and 40-41, Sakaguchi discloses changing the deformation parameters (a specific movement of the human model such as a leg or a hand gesture is moved and a selected number of parameters such as size information including height, shoulder, width, chest size associated with the selected body part is inputted via the input device to generate 3D animation images in which the human model moves in a specific manner; column 30, lines 37-65) of the garment in response to the change in dimensions of the human model and thereby simulating a corresponding frame of the animation image of the garment and thus simulating a deformation in the garment caused by the collision of the human model and the garment when the human model is moved (column 31, lines 21 to column 33, line 38). Referring to the claim 27, a different version of the animated image of the human model and a different version of the animated image of the garment are rendered frame by frame wherein the image of the garment is fitted to the image of the human model in a 3D space. Referring to the claim 28, Sakaguchi discloses the rendered image is used to form a visual image on a computer display device (col. 27, lines 25-67; column 31, lines 21-55; column 33, lines 25-38). Sakaguchi teaches rendering the garment animation images on the character images and simulating a deformation in the garment in a three-dimensional simulation scene wherein the animation involves a 3D human model wearing a garment from the external storage device and the scene is rendered frame by frame and **thereby simulating the wearing style of the human model as the scene is rendered**.

Re claim 34, the limitations of claim 34 are analyzed as discussed with respect to claim 1 above except for a user interface and a repository. Sakaguchi teaches the claimed limitation (col. 31, lines 20-55) when he discloses inputting the kind of the shape of the garment such as a dress or a two-piece suit and inputting the motion data from the motion data input device. As for a repository, Sakaguchi further discloses the computer system thus has a repository including the external storage device 75 or an external storage device 45 storing a plurality of garment images and the garment images generated by the garment animation image generator 7104 and rendering the animation images of human model wearing a dress or garment in walking by combining the **3D images** of the human model and the **stereoscopic images** of the garment frame by frame **by the Z buffer method** successively outputs the image data to the display device 76 (col. 31, lines 20-67 and column 32, lines 1-65) wherein the images of a plurality of patterns for the stereoscopic images of the garment are 2D images (column 23, lines 60-65).

Volino discloses in Page 10 and Page 17-18 the creation of the human models or the body representations. Volino discloses in Page 14 the garment design and simulation process wherein clothes are animated as deformable objects by assembling 2D panels wherein the garment models are designed as flat fabric panels using a 2D drawing software. The garment panels are used in the 3D simulation process wherein the animation will take place using mechanical simulation and then continuing the simulation on the animated scene and characters and the scene may contain several objects, static or animated, that will interact with the GARMENTS through collision. Volino teaches that garments are loaded from a file containing the description of the 2D panels and the panels are discretized into triangle meshes and then interactively placed in an initial position that is suitable for seaming. When dressing the actor, the initial position is

around the actor body. Then, using mechanical simulation, the panels are pulled together along the seaming lines using "elastics" which are attachment forces that pull together the corresponding vertices of both panels along the seaming line. Once the seaming lines are close enough, they are topologically merged, and the set of panels becomes one unique object. Volino discloses complex dressings containing several garments are animated concurrently by the program. Full interaction is provided by collision detection and optimization for multilayer animated objects provides stability of the overall system. Incremental collision detection is also used when relative movements are slow enough. Volino further discloses in Page 14 that the animated garments are finally recorded frame by frame as animations allowing incremental garment design for complex cloth.

Volino discloses a user interface by which a user selects a mannequin (e.g., Page 12 and the interface is disclosed in Page 13; see also Page 17) and one or more garments (Page 14) to be worn by the mannequin (Fig. 10), wherein the mannequin and garments selected may be further defined by specific mannequin and garment parameter values (e.g., Page 12 discloses generating a variety of human shapes; and Page 11 discloses generating human models with different sizes and proportions and five normalized parameters are used to scale the standard skeleton template to accommodate variations in age, sex and race); a repository containing a plurality of two-dimensional garment images and mannequin images as defined by specific parameters (Page 14 discloses that garments are loaded from a file containing the description of the 2D panels and the panels are discretized into triangle meshes and then interactively placed in an initial position that is suitable for seaming);

Volino discloses each two-dimensional garment image in the repository is generated by generating objects corresponding to a representative mannequin and a garment placed in a simulation scene within a three-dimensional modeling environment (Fig. 10). Volino discloses simulating draping and collision (e.g., self-collision, crumpling to the ground of Page 5, stretching and bending deformations of Page 9; bending and wrinkling of Page 8, etc) of the garment with the representative mannequin (Fig. 10) within the simulation scene to generate a three-dimensional rendering frame of the representative mannequin wearing the garment (Page 14; Page 8 also discloses the output is a collection of frames of the computed animation; see Fig. 4); constraining portions of the garment to reside within or outside of one or more shells (Page 17 discloses placing the clothes patterns around the body attaching them by elastic forces) defined around the representative mannequin in the rendering frame (Fig. 10 and Page 8 discloses simulating several garments concurrently with reasonable computation time and numerous and interacting collisions resulting from crumpling or multilayer cloth handled efficiently and robustly wherein the simulation involves the constraints and the collision detection algorithm builds a geometrical surface region hierarchy and takes advantage of surface curvature within and between adjacent surface regions wherein the surface regions around the human model forms the outside shells defined around the representative mannequin as shown in Fig. 10; see Page 9; in Page 14, the 2D panels for the garment models such as flat fabric panels are defined around the representative mannequin or the human model; when dressing an actor, the triangle meshes are placed around the actor body) and a compositing rule interpreter for displaying the two-dimensional images of user-selected garments and of a selected mannequin in a layered order dictated by compositing rules (e.g., the animated garments are recorded frame by

frame and can be re-used as input data for subsequent computations allowing for incremental garment design for complex cloth wherein scripts can be organized into specialized libraries for providing tools for setting up materials, fabric types and simulation conditions, etc., the garment simulation process includes the optimization for multilayer animated objects; see Page 14; Page 17 discloses a compositing rule wherein the display entities of different layers may be turned on/off allowing the designer to selectively check the skeleton, primitives, contours and skin envelope simultaneously; Page 14 discloses adding elastics by attaching points within the cloth or between the cloth and other objects and the list of objects in the scene can be added and/or removed interactively with simple buttons; see Page 16; and the next frames are calculated according to the physical model of the scene; see Page 17).

Re claim 44, the limitations of claim 44 are analyzed as discussed with respect to claims 1 and 34 above.

## *Conclusion*

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jin-Cheng Wang whose telephone number is (571) 272-7665. The examiner can normally be reached on 8:00 - 6:30 (Mon-Thu).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kee Tung can be reached on (571) 272-7794. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

jcw

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